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(54) Prefabricated, Transportable, Self-Supporting Slab, Panel or Molding and Production Process

A prefabricated, transportable, self-supporting slab, panel or molding has a concrete core and the front and rear sides have tiles or ceramic stoneware or earthenware plates. In order to achieve an appreciably lower thickness and weight of the slab, panel or mold, and further to make possible the permanent mounting of manageable objects without impairing their stability and the good self-supporting properties, on both sides of the inferior strength concrete slab, between the slab core (4), tiles or as the case may be ceramic sheets (14,16), and thin adhesive promoting layers (6,8) are provided. If, for the slab core, a concrete mixture with greater adhesiveness to the tiles or ceramic sheets is utilized, one can dispense with the adhesion promoting layer. Additionally, the slab core can have a centrally located reinforcement of steel reinforced concrete, a glass fiber mat or a glass fiber mesh.

Description

The invention relates to prefabricated, transportable, self-supporting slab, panel, or molding according to the overall concept of Claim 1 as well as a process for production of slabs, panels or molds.

Prefabricated slabs or panels which have a foam material core, together with glass fiber mats placed on both sides for the purpose of stabilization, are known in the art as semi-products. Tiles are laid down by the tile layer at the assembly location. Such slabs are however only self-supporting to a limited extent. The direct and lasting mounting of loaded objects on the slabs is practically impossible, and achieving strong connections to this type of panel element is to a large extent out of the question.

Further, prefabricated panels and slabs with a steel reinforced concrete core are known wherein the tiles are arranged on both sides by means of an adhesion promoting layer. In order to achieve sufficient stability the weight of the core has to be relatively high; in addition in order to provide greater strength it is necessary to employ steel mat reinforcement in the core and to ensure that the steel mat is embedded in the complete absence of air. For this it is necessary that the known panels or slabs have a thickness of about 5 cm which presents transportation and mounting problems

The task of the present invention consists in devising a slab, panel or molding to improve on the prior art so that in addition to having good stability and self-supporting properties, the size and weight of the slab, panel or molding are decreased so that permanent attachment of loaded objects is achieved. Additionally, a suitable process for fabrication of the slab, panel or molding is required..

The task is solved according to the teaching of Claim 1. An additional solution is given in Claim 3.

The slab, panel or molding developed according to the invention can be fabricated in a substantially thinner form than previously comparable slabs, panels or moldings. The slabs, panels or moldings according to the invention are nevertheless completely self-supporting and possess high stability The permanent attachment of load bearing objects is doubtless possible for example with dowels.

Additional examples of solutions to the problem according to the invention are given in Claims 2, 4, 5 and 6.

Processes to fabricate the slabs, panels or moldings according to the invention are given in Claims 7 and 8 and other modifications in Claims 8, 10 and 11. The process according to the invention makes possible the prefabrication of other larger designs of the slabs, panels or moldings

The invention is further explained by reference to the attached drawings.

Figures 1 - 4 show cross-sections of different working forms of prefabricated slabs, panels or moldings.

Similar components in the figures have the same reference numbers.

Figure 1 shows a slab, panel or molding 2 with a thin concrete core. On both sides of the concrete core there are adhesion promoting layers 6 and 8 with embedded glass mats of glass fiber structures 10 and 12. Attached to the adhesive layers 6 and 8 are flagstones, ceramic plates or stoneware or earthenware plates.

Fabrication of the slab, panel or molding 2 requires the following steps: Onto an evenly arranged surface (not shown) first of all a layer of tiles or ceramic plates 14 is laid with the glazing facing downwards. Then, on the other side of the tiles or ceramic sheets a relatively fluid adhesion layer 6 is thinly applied. The

glass fiber mat or as the case may be glass fiber mesh is then placed laid on this adhesion layer 6 and pressed into the adhesion layer. The fresh concrete for the sheet core 4 is thinly distributed onto the still damp adhesion layer. Onto the fresh concrete layer then the similarly relatively moist adhesion promoting layer 8 is thinly applied. Onto the adhesion promoting layer 8 the glass fiber mat or as the case may be the glass fiber mesh 12 is laid down. After pressing the glass fiber mat or as the case may be the glass fiber mesh 12 into the adhesion promoting layer 8 the tiles or ceramic plates 16 with their bottom side contacting the damp adhesion promoting layer are laid down. Before hardening occurs this is followed by tamping down or shaking the tiles and ceramic plates 16.

Laying down the adhesion promoting layer with an embedded glass fiber mat or an embedded glass fiber mesh can also be accomplished by first placing the glass fiber mat or glass fiber mesh 10 or 12 onto the tiles or ceramic plates 14, or laying it on top of the fresh concrete layer 4 and subsequently applying the adhesion promoting layer 6 and 8 onto the glass fiber mat or glass fiber mesh.

It is also possible to dispense with the adhesion promoting layer entirely, as is shown schematically in figure 2. In this case, the concrete core 4' should consist of a concrete mixture whose composition ensures greater adhesion of the ceramic tile 14, 16 to the core sheet 4'. The glass fiber mat or the glass fiber mesh on both sides of the core sheet 4' is in this case embedded in the surfaces of the concrete mixture.

There also exists the possibility of fabricating the slabs, panels or moldings - in addition to the glass fiber mats or glass fiber reinforcement 4, 12 in the adhesion promoting layers 6, 8 - with an additionally centrally located reinforcement of steel, glass fiber mat or glass fiber structure in the sheet core 4, as shown in Figure 4.

Also, in the example shown in Figure 3, one can dispense with the adhesion promoting layers 6, 8, if the sheet core 4' consists of a concrete mixture whose composition ensures a sufficiently strong bond to tiles 14, 16 and the sheet core - analogous to the model shown in Figure 2. This is shown schematically in Figure 4.

Between the tiles and the ceramic sheets, as is customary a seam 20 (*translator: 20 does not appear on any of the figures*) is provided, that is filled with seam filler material. This material is normally not sufficiently impervious to water which can be a disadvantage in damp locations. It is therefore recommended that in such situations at least one of the adhesion promoting layers 6 and 8 in the example shown in Figures 1 and 3 contain an adhesion promoting material that becomes water impervious after hardening.

In the models shown in Figures 2 and 4 it is recommended that for the core sheet 4' a water impervious concrete material be used. In the examples shown in Figures 1 and 3, it is similarly recommended that a water resistant material be utilized for the sheet core 4.

Patent Claims

1. Prefabricated, transportable and self-supporting slabs, panels and moldings with a concrete sheet as the core and on both the front and rear sides, tiles or ceramic plates, of stoneware or earthenware, characterized in that on both sides of the small-sized concrete sheet core (4), between the core and the tiles, or as the case may be, ceramic plates (14,16) thin adhesion promoting layers (6,8) with embedded glass fiber or glass fiber mesh are provided.

2. Slabs, panels or moldings according to Claim 1, characterized in that the adhesion promoting layer is about the same size as the glass fiber mats or is slightly larger.

3. Prefabricated, transportable, self-supporting slabs, panels and moldings with a concrete sheet as the core and on both the front and rear sides, tiles or ceramic plates, of stoneware or earthenware, characterized in that both sides of the small-sized concrete core (4) utilize a concrete mix with stronger adhesion to the tiles or ceramic sheets, glass fiber mats or glass fiber mesh (10,12) that are embedded on both sides of the core sheet in the concrete mixture.

4. Slabs, panel or molding according to Claims 1-3 characterized in that the sheet core (4,4') has a central reinforcement (18) of steel, of glass fiber mat or glass fiber mesh.

5. Slabs, panel or molding according to one of the previous claims, characterized in that the slab, panel or molding (2) has a thickness of 2 to 2.5 cm.

6. Sheets, panel or molding according to one of the previous claims, characterized in that at least one of the adhesion promoting layers (6,8) is made from a hardened water resistant material and/or that the sheet core (4,4') consists of a water-resistant concrete material.

7. Process for fabrication of sheets, panel or molding according to one of Claims 1, 2, 5 and 6, comprising the following steps:

- Laying down the tiles or ceramic sheets (14) with the glazing facing downwards on an even supporting surface.
- Applying the thin and relatively fluid adhesion promoting layer (6) onto the tiles or ceramic sheets.
- Laying down and pressing in the glass fiber mat or the glass fiber mesh into the damp adhesion promoting layer.
- Applying a thin fresh concrete layer (4) onto the damp adhesion promoting layer (6).
- Applying the thin relatively fluid adhesion promoting layer onto the fresh concrete layer (4).
- Laying down and pressing the glass fiber mat into the damp adhesion promoting layer (8).
- Tamping or shaking the tiles or ceramic sheets (16).
- Allowing to harden.

8. Process according to Claim 7, characterized in that application of the adhesion promoting layers with embedded lass fiber mats or glass fiber mesh in that initially the glass fiber mats or the glass fiber structures (10,12) are laid down onto the tiles or ceramic sheets (14), or as the case may be onto the fresh concrete layer (4) and that the adhesion promoting layers (6,8) are applied onto the glass fiber mats or glass fiber meshes (10,12).

9. Process for fabricating slabs, panels or moldings according to Claim 3 or 6 comprising the following steps:

- Laying down the tiles or ceramic sheets (14) with the glazing face down.
- Applying a thin layer of concrete mixture (4').
- Laying down and pressing the glass fiber mat or glass fiber structure (10) into the damp concrete mix (4').
- Applying the concrete mix (4').
- Laying down and pressing the glass fiber mat or glass fiber structure (12) into the damp concrete mix (4').

- Applying a thin layer of concrete mixture (4').
- Laying down the tile or ceramic sheets (16) with their underside facing the thin layer of concrete mixture.
- Tamping down or shaking the tiles or ceramic sheets (16).
- Allowing to harden.

10. Process according to one of Claims 7 to 9, characterized in that additionally a reinforcement steel or glass fiber mat or glass fiber mesh is embedded centrally.

11. Process according to one of Claims 7 to 10 characterized in that at least for one of the adhesion promoting layers (6,8) a hardened water resistant adhesion promoting material is utilized and/or that for the fresh concrete layer (4) or as the case may be the concrete mixture (4') a water resistant material is employed.

2 pages of figures attached

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Fig. 1

Fig. 2

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Fig. 3

Fig. 4